

WHAT IS CLAIMED IS:

1. A transceiver system comprising:
an antenna;
a filter unit; and

5 a plurality of radio base stations each of which have
a duplex filter incorporated therein all of which are
coupled to said filter unit which in turn is coupled to
said antenna, wherein said radio base stations share said
antenna even if said radio base stations share a frequency
10 band and even if said radio base stations operate with
different radio standards.

2. The transceiver system of Claim 1, wherein said
filter unit includes:

15 a diplex filter, coupled to said antenna, said diplex
filter includes:

a full-band receiver (RX) filter; and

two part-band transceiver (TX) filters,
where said full-band RX filter is coupled to the first
20 part-band TX filter; and

a first duplex filter that includes:

a TX filter coupled to the second part-band
TX filter in said diplex filter; and

a RX filter; and

25 said first radio base station having a duplex filter
incorporated therein that is coupled to the full-band RX

filter and the first part-band TX filter in said diplex filter;

5 said first radio base station also interfaces with a splitter that couples a RX signal received from the full-band RX filter in said diplex filter to the RX filter in said first duplex filter; and

 said second radio base station having a duplex filter incorporated therein that is coupled to the TX filter and the RX filter in said first duplex filter.

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3. The transceiver system of Claim 2, further comprising:

 said diplex filter further includes:

 a third part-band transceiver (TX) filter;

15 and

 a second duplex filter that includes:

 a TX filter coupled to the third part-band TX filter in said diplex filter; and

 a RX filter; and

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 said third radio base station having a duplex filter incorporated therein that is coupled to the TX filter and the RX filter in said second duplex filter that has the RX filter which receives the RX signal from the splitter.

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4. The transceiver system of Claim 1, wherein said filter unit includes:

a part-band duplex filter, coupled to said antenna, said part-band duplex filter includes:

5 two part-band receiver (RX) filters; and
 two part-band transceiver (TX) filters,
where the first part-band RX filter is coupled to the first part-band TX filter and where the second part-band RX filter is coupled to the second part-band TX filter; and

10 said first radio base station having a duplex filter incorporated therein that is coupled to the first part RX filter and the first part-band TX filter in said part-band duplex filter; and

15 said second radio base station having a duplex filter incorporated therein that is coupled to the second part-band RX filter and the second part-band TX filter in said part-band duplex filter.

20 5. The transceiver system of Claim 4, further comprising:

said part-band duplex filter further includes:

 a third part-band receiver (RX) filter; and
 a third part-band transceiver (TX) filter,
where the third part-band RX filter is coupled to the third part-band TX filter; and

25 said third radio base station having a duplex filter incorporated therein that is coupled to the third part-band

RX filter and the third part-band TX filter in said part-band duplex filter.

6. The transceiver system of Claim 1, wherein said
5 filter unit includes:

an antenna;

a diplex-duplex filter, coupled to said antenna, said
diplex-duplex filter includes:

two full-band receiver (RX) filters; and

10 two part-band transceiver (TX) filters,
where the first full-band RX filter is coupled to the first
part-band TX filter and where the second full-band RX
filter is coupled to the second part-band TX filter; and

15 said first radio base station having a duplex filter
incorporated therein that is coupled to the first full-band
RX filter and the first part-band TX filter in said diplex-
duplex filter;

20 said first radio base station also interfaces with a
splitter that couples a RX signal received from the first
full-band RX filter to the second full-band RX filter in
said diplex-duplex filter, wherein the second full-band RX
filter is not connected to said antenna; and

25 said second radio base station having a duplex filter
incorporated therein that is coupled to the second full-
band RX filter and the second part-band TX filter in said
diplex-duplex filter.

7. The transceiver system of Claim 6, further comprising:

said diplex-duplex filter further includes:

a third full-band receiver (RX) filter; and

5 a third part-band transceiver (TX) filter,
where the third full-band RX filter is coupled to the third
part-band TX filter; and

10 said third radio base station having a duplex filter
incorporated therein that is coupled to the third full-band
RX filter and the third part-band TX filter in said diplex-
duplex filter, wherein the third full-band RX filter is not
connected to said antenna but instead receives the RX
signal from the splitter.

15 8. The transceiver system of Claim 1, wherein said
filter unit includes:

an antenna;

a diplex-duplex filter, coupled to said antenna, said
diplex-duplex filter includes:

20 two full-band receiver (RX) filters; and

two part-band transceiver (TX) filters,
where the second full-band RX filter is coupled to the
second part-band TX filter; and

25 said first radio base station having a duplex filter
incorporated therein that is coupled to the first full-band
RX filter by way of a low noise amplifier and is also
coupled to first part-band TX filter in said diplex-duplex
filter;

said low noise amplifier also couples a RX signal received from the first full-band RX filter to the second full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

said second radio base station having a duplex filter incorporated therein that is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

9. The transceiver system of Claim 8, further comprising:

said diplex-duplex filter further includes:

a third full-band receiver (RX) filter; and
a third part-band transceiver (TX) filter,
where the third full-band RX filter is coupled to the third part-band TX filter; and

said third radio base station having a duplex filter incorporated therein that is coupled to the third full-band RX filter and the third part-band TX filter in said diplex-duplex filter, wherein the third full-band RX filter is not connected to said antenna but instead receives the RX signal from the low noise amplifier.

10. The transceiver system of Claim 1, wherein said radio standards include:

time division multiple access (TDMA);
code division multiple access (CDMA);

wideband division multiple access (WCDMA); and
global system for mobile communication (GSM).

11. A method for constructing a transceiver system
5 comprising the steps of:

providing an antenna;

providing a filter unit; and

10 providing at least two radio base stations each of
which have a duplex filter incorporated therein all of
which are coupled to said filter unit which in turn is
coupled to said antenna, wherein said radio base stations
share said antenna even if said radio base stations share a
frequency band and even if said radio base stations operate
with different radio standards.

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12. The method of Claim 11, wherein said filter
unit includes:

a duplex filter, coupled to said antenna, said duplex
filter includes:

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a full-band receiver (RX) filter; and

two part-band transceiver (TX) filters,

where said full-band RX filter is coupled to the first
part-band TX filter; and

a first duplex filter that includes:

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a TX filter coupled to the second part-band
TX filter in said duplex filter; and

a RX filter; and

said first radio base station includes the duplex filter incorporated therein which is coupled to the full-band RX filter and the first part-band TX filter in said diplex filter;

5 . said first radio base station also interfaces with a splitter that couples a RX signal received from the full-band RX filter in said diplex filter to the RX filter in said first duplex filter; and

10 said second radio base station includes the duplex filter incorporated therein which is coupled to the TX filter and the RX filter in said first duplex filter.

13. The method of Claim 12, wherein said step of providing at least two radio base stations includes adding
15 a new radio base station to the at least two radio base stations in which case said diplex filter further includes:

 a third part-band transceiver (TX) filter;
and

 a second duplex filter that includes:

20 a TX filter coupled to the third part-band TX filter in said diplex filter; and

 a RX filter; and

25 said new radio base station includes a duplex filter incorporated therein which is coupled to the TX filter and the RX filter in said second duplex filter that has the RX filter which receives the RX signal from the splitter.

14. The method of Claim 11, wherein said filter unit includes:

a part-band duplex filter, coupled to said antenna, said part-band duplex filter includes:

5 two part-band receiver (RX) filters; and

two part-band transceiver (TX) filters, where the first part-band RX filter is coupled to the first part-band TX filter and where the second part-band RX filter is coupled to the second part-band TX filter; and

10 said first radio base station includes the duplex filter incorporated therein, which is coupled to the first part RX filter and the first part-band TX filter in said part-band duplex filter; and

15 said second radio base station includes the duplex filter incorporated therein which is coupled to the second part-band RX filter and the second part-band TX filter in said part-band duplex filter.

15. The method of Claim 14, wherein said step of providing at least two radio base stations includes adding a new radio base station to the at least two radio base stations in which case said part-band duplex filter further includes:

a third part-band receiver (RX) filter; and

25 a third part-band transceiver (TX) filter, where the third part-band RX filter is coupled to the third part-band TX filter; and

said new radio base station includes a duplex filter incorporated therein which is coupled to the third part-band RX filter and the third part-band TX filter in said part-band duplex filter.

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16. The method of Claim 11, wherein said filter unit includes:

a diplex-duplex filter, coupled to said antenna, said diplex-duplex filter includes:

10 two full-band receiver (RX) filters; and
 two part-band transceiver (TX) filters,
where the first full-band RX filter is coupled to the first part-band TX filter and where the second full-band RX filter is coupled to the second part-band TX filter; and

15 said first radio base station includes the duplex filter incorporated therein which is coupled to the first full-band RX filter and the first part-band TX filter in said diplex-duplex filter;

20 said first radio base station also interfaces with a splitter that couples a RX signal received from the first full-band RX filter to the second full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

25 said second radio base station includes the duplex filter incorporated therein which is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

17. The method of Claim 16, wherein said step of providing at least two radio base stations includes adding a new radio base station to the at least two radio base stations in which case said diplex-duplex filter further includes:

a third full-band receiver (RX) filter; and
a third part-band transceiver (TX) filter,
where the third full-band RX filter is coupled to the third part-band TX filter; and

said new radio base station includes a duplex filter incorporated therein which is coupled to the third full-band RX filter and the third part-band TX filter in said diplex-duplex filter, wherein the third full-band RX filter is not connected to said antenna but instead receives the RX signal from the splitter.

18. The method of Claim 11, wherein said filter unit includes:

a diplex-duplex filter, coupled to said antenna, said diplex-duplex filter includes:

two full-band receiver (RX) filters; and
two part-band transceiver (TX) filters,
where the second full-band RX filter is coupled to the second part-band TX filter; and

said first radio base station includes the duplex filter incorporated therein which is coupled to the first full-band RX filter by way of a low noise amplifier and is

also coupled to first part-band TX filter in said diplex-duplex filter;

5 said low noise amplifier also couples a RX signal received from the first full-band RX filter to the second full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

10 said second radio base station includes the duplex filter incorporated therein which is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

15 19. The method of Claim 18, wherein said step of providing at least two radio base stations includes adding a new radio base station to the at least two radio base stations in which case said diplex-duplex filter further includes:

20 a third full-band receiver (RX) filter; and
 a third part-band transceiver (TX) filter,
where the third full-band RX filter is coupled to the third part-band TX filter; and

25 said third radio base station includes a duplex filter incorporated therein which is coupled to the third full-band RX filter and the third part-band TX filter in said diplex-duplex filter, wherein the third full-band RX filter is not connected to said antenna but instead receives the RX signal from the low noise amplifier.

20. The method of Claim 11, wherein said radio standards include:

time division multiple access (TDMA);
code division multiple access (CDMA);
5 wideband division multiple access (WCDMA); and
global system for mobile communication (GSM).

21. An antenna coupled to a filter unit which is coupled to a plurality of duplex filters that are respectively incorporated within a plurality of radio base stations, wherein said radio base stations share said antenna even if said radio base stations share a frequency band and even if said radio base stations operate with different radio standards.

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22. The antenna of Claim 21, wherein said filter unit includes:

a duplex filter, coupled to said antenna, said duplex filter includes:

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a full-band receiver (RX) filter; and
two part-band transceiver (TX) filters,
where said full-band RX filter is coupled to the first part-band TX filter; and

a first duplex filter that includes:

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a TX filter coupled to the second part-band TX filter in said duplex filter; and
a RX filter; and

said first radio base station includes the duplex filter incorporated therein which is coupled to the full-band RX filter and the first part-band TX filter in said duplex filter;

5 said first radio base station also interfaces with a splitter that couples a RX signal received from the full-band RX filter in said duplex filter to the RX filter in said first duplex filter; and

10 said second radio base station includes the duplex filter incorporated therein which is coupled to the TX filter and the RX filter in said first duplex filter.

23. The antenna of Claim 22, further comprising:
said duplex filter further includes:

15 a third part-band transceiver (TX) filter;
and

a second duplex filter that includes:

a TX filter coupled to the third part-band TX filter in said duplex filter; and

20 a RX filter; and

said third radio base station includes the duplex filter incorporated therein which is coupled to the TX filter and the RX filter in said second duplex filter that has the RX filter which receives the RX signal from the
25 splitter.

24. The antenna of Claim 21, wherein said filter unit includes:

a part-band duplex filter, coupled to said antenna, said part-band duplex filter includes:

5 two part-band receiver (RX) filters; and
 two part-band transceiver (TX) filters,
where the first part-band RX filter is coupled to the first part-band TX filter and where the second part-band RX filter is coupled to the second part-band TX filter; and

10 said first radio base station includes the duplex filter incorporated therein which is coupled to the first part RX filter and the first part-band TX filter in said part-band duplex filter; and

15 said second radio base station includes the duplex filter incorporated therein which is coupled to the second part-band RX filter and the second part-band TX filter in said part-band duplex filter.

25. The antenna of Claim 24, further comprising:

20 said part-band duplex filter further includes:

 a third part-band receiver (RX) filter; and
 a third part-band transceiver (TX) filter,
where the third part-band RX filter is coupled to the third part-band TX filter; and includes the duplex filter
25 incorporated therein which is coupled to the third part-band RX filter and the third part-band TX filter in said part-band duplex filter.

26. The antenna of Claim 21, wherein said filter unit includes:

an antenna;

5 a diplex-duplex filter, coupled to said antenna, said diplex-duplex filter includes:

two full-band receiver (RX) filters; and

two part-band transceiver (TX) filters,

where the first full-band RX filter is coupled to the first part-band TX filter and where the second full-band RX filter is coupled to the second part-band TX filter; and

10 said first radio base station includes the duplex filter incorporated therein which is coupled to the first full-band RX filter and the first part-band TX filter in said diplex-duplex filter;

15 said first radio base station also interfaces with a splitter that couples a RX signal received from the first full-band RX filter to the second full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

20 said second radio base station includes the duplex filter incorporated therein which is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

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27. The antenna of Claim 26, further comprising:

said diplex-duplex filter further includes:

a third full-band receiver (RX) filter; and

a third part-band transceiver (TX) filter,

5 where the third full-band RX filter is coupled to the third part-band TX filter; and

said third radio base station includes the duplex filter incorporated therein which is coupled to the third full-band RX filter and the third part-band TX filter in
10 said diplex-duplex filter, wherein the third full-band RX filter is not connected to said antenna but instead receives the RX signal from the splitter.

28. The transceiver system of Claim 21, wherein
15 said filter unit includes:

a diplex-duplex filter, coupled to said antenna, said diplex-duplex filter includes:

two full-band receiver (RX) filters; and

two part-band transceiver (TX) filters,

20 where the second full-band RX filter is coupled to the second part-band TX filter; and

said first radio base station includes the duplex filter incorporated therein which is coupled to the first full-band RX filter by way of a low noise amplifier and is
25 also coupled to first part-band TX filter in said diplex-duplex filter;

said low noise amplifier also couples a RX signal received from the first full-band RX filter to the second

full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

5 said second radio base station includes the duplex filter incorporated therein which is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

29. The antenna of Claim 28, further comprising:
10 said diplex-duplex filter further includes:
 a third full-band receiver (RX) filter; and
 a third part-band transceiver (TX) filter,
where the third full-band RX filter is coupled to the third part-band TX filter; and

15 said third radio base station includes the duplex filter incorporated therein which is coupled to the third full-band RX filter and the third part-band TX filter in said diplex-duplex filter, wherein the third full-band RX filter is not connected to said antenna but instead
20 receives the RX signal from the low noise amplifier.

30. The antenna of Claim 21, wherein said radio standards include:
 time division multiple access (TDMA);
25 code division multiple access (CDMA);
 wideband division multiple access (WCDMA); and
 global system for mobile communication (GSM).

31. A radio base station comprising:

5 a duplex filter that is coupled to a filter unit which in turn is coupled to an antenna, wherein an additional radio base station which also incorporates a duplex filter is coupled to said filter unit such that said radio base stations can share the antenna even if said radio base stations share a frequency band and even if said radio base stations operate with different radio standards.

10 32. The radio base station of Claim 31, wherein said filter unit includes:

a duplex filter, coupled to said antenna, said duplex filter includes:

15 a full-band receiver (RX) filter; and
two part-band transceiver (TX) filters,
where said full-band RX filter is coupled to the first part-band TX filter; and

a first duplex filter that includes:

20 a TX filter coupled to the second part-band TX filter in said duplex filter; and

a RX filter; and

25 said radio base station includes the duplex filter incorporated therein which is coupled to the full-band RX filter and the first part-band TX filter in said duplex filter;

said radio base station also interfaces with a splitter that couples a RX signal received from the full-

band RX filter in said diplex filter to the RX filter in said first duplex filter; and

5 said additional radio base station includes the duplex filter incorporated therein which is coupled to the TX filter and the RX filter in said first duplex filter.

33. The radio base station of Claim 31, wherein said filter unit includes:

10 a part-band duplex filter, coupled to said antenna, said part-band duplex filter includes:

 two part-band receiver (RX) filters; and
 two part-band transceiver (TX) filters,
where the first part-band RX filter is coupled to the first part-band TX filter and where the second part-band RX
15 filter is coupled to the second part-band TX filter; and

 said first radio base station includes the duplex filter incorporated therein which is coupled to the first part RX filter and the first part-band TX filter in said part-band duplex filter; and

20 said additional radio base station includes the duplex filter incorporated therein which is coupled to the second part-band RX filter and the second part-band TX filter in said part-band duplex filter.

25 34. The radio base station of Claim 31, wherein said filter unit includes:

 a diplex-duplex filter, coupled to said antenna, said diplex-duplex filter includes:

two full-band receiver (RX) filters; and
two part-band transceiver (TX) filters,
where the first full-band RX filter is coupled to the first
part-band TX filter and where the second full-band RX
5 filter is coupled to the second part-band TX filter; and

said radio base station includes the duplex filter
incorporated therein which is coupled to the first full-
band RX filter and the first part-band TX filter in said
diplex-duplex filter;

10 said radio base station also interfaces with a
splitter that couples a RX signal received from the first
full-band RX filter to the second full-band RX filter in
said diplex-duplex filter, wherein the second full-band RX
filter is not connected to said antenna; and

15 said additional radio base station includes the duplex
filter incorporated therein which is coupled to the second
full-band RX filter and the second part-band TX filter in
said diplex-duplex filter.

20 35. The radio base station of Claim 31, wherein
said filter unit includes:

a diplex-duplex filter, coupled to said antenna, said
diplex-duplex filter includes:

two full-band receiver (RX) filters; and
25 two part-band transceiver (TX) filters,
where the second full-band RX filter is coupled to the
second part-band TX filter; and

5 said first radio base station includes the duplex filter incorporated therein which is coupled to the first full-band RX filter by way of a low noise amplifier and is also coupled to first part-band TX filter in said diplex-duplex filter;

10 said low noise amplifier also couples a RX signal received from the first full-band RX filter to the second full-band RX filter in said diplex-duplex filter, wherein the second full-band RX filter is not connected to said antenna; and

15 said additional radio base station includes the duplex filter incorporated therein which is coupled to the second full-band RX filter and the second part-band TX filter in said diplex-duplex filter.

36. The antenna of Claim 31, wherein said radio standards include:

20 time division multiple access (TDMA);
 code division multiple access (CDMA);
 wideband division multiple access (WCDMA); and
 global system for mobile communication (GSM).